

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KATSUYUKI MUSAKA

Appeal No. 1999-2512
Application No. 08/888,499

ON BRIEF

Before WARREN, WALTZ, and POTEATE, Administrative Patent Judges.
WALTZ, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal from the examiner's final rejection of claims 29 through 40 and 42 through 45, which are the only claims remaining in this application. We have jurisdiction pursuant to 35 U.S.C. § 134.

According to appellants, the invention is directed to a plasma enhanced chemical vapor deposition process for depositing a halogen-containing silicon dioxide onto a substrate from a mixture of tetraethoxysilane (TEOS) and a halogen-containing gas, where the plasma is formed by simultaneously turning on a plurality of power

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sources having different frequencies (Brief, page 2). Appellants state that claims 29-38 and 44 should be considered as one group and claims 39-40, 42-43 and 45 should be considered as a second group (Brief, page 4). Appellants do provide reasonably specific, substantive arguments for the separate patentability of each group (e.g., Brief, page 8). Accordingly, pursuant to the provisions of 37 CFR § 1.192(c)(7)(1997), we select one claim from each group (i.e., claims 29 and 39) and decide the grounds of rejection in this appeal on the basis of these claims alone, with the other claims in each group standing or falling together.¹ A copy of illustrative claim 29 is attached as an Appendix to this decision.

The examiner has relied upon the following references as support for the rejections on appeal:

Kuyel	4,282,267	Aug. 04, 1981
Yamazaki	4,461,783	Jul. 24, 1984
Ishihara et al. (Ishihara)	4,818,563	Apr. 04, 1989
Lane et al. (Lane)	4,894,352	Jan. 16, 1990
Chebi et al. (Chebi)	5,279,865	Jan. 18, 1994
Homma	5,288,518	Feb. 22, 1994
Nguyen et al. (Nguyen)	5,356,722	Oct. 18, 1994
Nishiyama et al. (Nishiyama)	5,429,995	Jul. 04, 1995
Musaka et al. (Musaka)	5,571,571	Nov. 05, 1996

¹Of course, for the ground of rejection of claim 31 alone under 35 U.S.C. § 103(a) over Nishiyama, we must consider claim 31. See *In re McDaniel*, 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002).

The following rejections are before us for consideration in this appeal:

(1) claims 29-38 and 44 stand rejected under the first and second paragraphs of 35 U.S.C. § 112, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor has possession of the subject matter in question (Answer, page 7), for lack of enabling disclosure (Answer, page 4), and as indefinite (id.);²

(2) claims 29-30, 32-34, 38 and 44 stand rejected under 35 U.S.C. § 102 (e) as anticipated by Nishiyama (Answer, page 8);

(3) claims 39-40, 42-43 and 45 stand rejected under 35 U.S.C. § 103 (a) as unpatentable over Nishiyama (Answer, page 9);

(4) claim 31 stands rejected under 35 U.S.C. § 103 (a) as unpatentable over Nishiyama in view of Chebi (Answer, page 10);

(5) claims 29-40 and 42-45 stand rejected under 35 U.S.C. § 103 (a) as unpatentable over Lane in view of Ishihara and Yamazaki or Kuyel or Chebi (Answer, page 11);

² For reasons of judicial economy, we have merged the examiner's three separate rejections under section 112 since the same claims have been rejected in each rejection.

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(6) claims 29-32, 38-40 and 42-45 stand rejected under 35 U.S.C. § 103 (a) as unpatentable over Homma in view of Chebi or Nguyen (Answer, page 17); and

(7) claims 29-33, 38-40 and 42-45 stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-10 of Musaka (Answer, page 19).

We reverse the examiner's rejections based on 35 U.S.C. § 112, first and second paragraphs, and the section 103 (a) rejections with Lane or Homma as the primary references. We affirm the rejection for obviousness-type double patenting and all of the examiner's rejections under section 102(e) or 103 (a) with Nishiyama as a primary or sole reference. Accordingly, the decision of the examiner is affirmed-in-part. Our reasons follow.

OPINION

A. The Rejections under 35 U. S. C. § 112

Any analysis of the claims for compliance with section 112 must first begin with the requirements of the second paragraph. See *In re Moore*, 439 F.2d 1232, 1234-35, 169 USPQ 236, 238 (CCPA 1971). The legal standard for definiteness under the second paragraph of section 112 is whether one of ordinary skill in the art would have

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been apprised of the scope of the claims when read in light of the specification. See *In re Warmerdam*, 33 F.3d 1354, 1361, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994). As with any rejection for unpatentability, the initial burden of proof rests with the examiner. See *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). In the rejection on appeal, the examiner fails to state any reasons or evidence to support the rejection under section 112, second paragraph (see the Answer, page 4). Since the examiner uses the terms "confusing" and "confusion in the intended meaning" when discussing the rejection for lack of enablement under the first paragraph of section 112 (*id.*), we will consider the explanation on pages 4-7 of the Answer to also apply to the rejection under the second paragraph of section 112.

With regard to the rejection under the first paragraph of section 112 for lack of enablement, the examiner finds appellants' terminology "confusing" since the term "vacuum deposition chamber" is allegedly unclear since it appears to include both the "plasma creation chamber 80" and the "deposition chamber 78" while the specification defines this term differently (Answer, page 4). The examiner finds that the term "vacuum deposition chamber" as read in light of the specification would appear to refer to chambers 78 or

38, except when microwaves are supplied the term refers to the plasma creation chamber where no deposition takes place. *Id.*

As correctly argued by appellants, parallel plate reactors and ECR chambers were well known in the art at the time of the present invention (Brief, page 5; Reply Brief, page 2). The examiner has not met the initial burden of establishing that one of ordinary skill in this art would not have been apprised of the scope of the claimed term "forming a plasm in said chamber." We determine that one of ordinary skill would have known where the plasma was formed depending on the power source, as taught by appellants' specification (pages 7-9 and 11-13). Similarly, with regard to enablement, the examiner has not found any underlying factual criteria that would support a conclusion of lack of enabling disclosure. *See In re Wright*, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993); *In re Wands*, 858 F.2d 731, 735, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). The examiner has failed to show that one of ordinary skill in this art would not know how to make and use the invention from appellants' original disclosure, regardless of the terms employed to denote where the plasma is created or deposited.

With regard to the rejection based on the "written description" requirement of section 112 (Answer, page 7), the

examiner states that there is no description in the original specification to support the claimed term "a plurality of power sources connected to said chamber." The examiner refers to Figures 3 and 5 for the showing that no power sources are connected to the chamber, but they are "enclosed or associated therewith." *Id.*

Again as correctly argued by appellants, one of ordinary skill in the art knew how to use two power sources and connect them to the chamber (Brief, page 6; see also the specification, page 4). The examiner apparently has construed "connected to said chamber" as meaning directly connected to the chamber. However, the examiner's construction is not reasonable in light of the specification, as shown by Figures 3 and 5. See *In re Morris*, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). In view of this claim construction, we determine that the subject matter in question was described in the original specification in such a manner that would have reasonably conveyed to one of ordinary skill in the art that appellants were in possession of the claimed invention. See *In re Edwards*, 568 F.2d 1349, 1351-52, 196 USPQ 465, 467 (CCPA 1978).

For the foregoing reasons, we determine that the examiner has not met the initial burden of establishing noncompliance with the written description, enablement, and definiteness requirements of

35 U.S.C. § 112. Accordingly, we cannot sustain any of the examiner's rejections based on the first and second paragraphs of 35 U.S.C. § 112.

B. The Rejections over Nishiyama

The examiner sets forth findings of fact and conclusions of law based on Nishiyama on pages 8-10 of the Answer. Appellants do not challenge either the examiner's factual findings or conclusions of law. The only argument concerning Nishiyama presented by appellants is that Nishiyama is not "prior art," and appellants rely on their priority date to overcome this reference (Brief, pages 6-7). This argument is not well taken since appellants have not filed a certified translation of their foreign priority document and thus are not entitled to their priority date of Apr. 17, 1993. See the *Manual of Patent Examining Procedure (MPEP)*, § 201.15, 7th ed., Rev. 1, Feb. 2000. It is noted that the effective U. S. filing date of Nishiyama is July 16, 1993, but we see no relevance, and appellants have not explained the relevance, of the submission of a translation of Nishiyama's earliest foreign priority document (Brief, page 7).

The examiner has combined Chebi with Nishiyama in the rejection of claim 31 for the teaching in Chebi that microwave

frequency power sources produce advantageous results for the deposition of silicon dioxide in high aspect ratio substrates (Answer, page 10). From these findings, the examiner concludes that it would have been obvious to use the technique of producing plasma taught by Chebi in the process of Nishiyama for the desirable results achieved with high aspect ratio substrates (*id.*). We agree.

Appellant concedes that microwave power sources were known at the time of the present invention (Brief, page 8) but argues that Chebi is not directed to depositing a fluorine-containing silicon dioxide layer, nor using TEOS and a halogen-containing gas as precursors (Brief, page 7). Appellant's argument is correct but not persuasive. As found by the examiner, the process of Chebi is directed to the same purposes as appellant's process, namely deposition of silicon dioxide from precursor gases where spacing between wires is very small, i.e., where the aspect ratio is high (Answer, page 10). Accordingly, we determine that it would have been well within the ordinary skill in this art to use other well known power sources to create a plasma, as shown by Chebi, in the process of Nishiyama, with a reasonable expectation of success. See *In re Vaeck*, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991).

For the foregoing reasons and those stated in the Answer, we determine that the examiner has established a *prima facie* case of anticipation and obviousness which has not been adequately rebutted by appellant. Accordingly, the rejections of claims 29, 30, 32-34, 38 and 44 under 35 U.S.C. § 102(e) over Nishiyama; claims 39-40, 42-43 and 45 under 35 U.S.C. § 103 (a) over Nishiyama; and claim 31 under 35 U.S.C. § 103(a) over Nishiyama in view of Chebi are affirmed.

C. The Rejection for Obviousness-type Double Patenting

The examiner finds that claims 29-33, 38-40 and 42-45 are not patentably distinct from the claims of Musaka since both sets of claims require the presence of halogen in silicon dioxide as it is deposited from TEOS and a source of fluorine when using a plasma process of like frequencies (Answer, page 19). Appellant only argues that "[t]his application [sic, patent] is not prior art" (Brief, page 14) and "Musaka ... is not prior art" (Reply Brief, page 3). Appellant contends that "the issue here is one of prior art, not obviousness." *Id.*

As correctly argued by the examiner (Answer, page 20), appellant's contention is not well taken. To support a rejection

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under the judicially created doctrine of obviousness-type double patenting, the reference need only be commonly assigned and copending, not prior art under 35 U.S.C. § 102/§ 103. See *In re Braithwaite*, 379 F.2d 594, 600 n.4, 154 USPQ 29, 34 n.4 (CCPA 1967).

For the foregoing reasons and those set forth in the Answer, we determine that the examiner has established a *prima facie* case of obviousness-type double patenting in view of Musaka, which has not been adequately rebutted by appellant. Accordingly, the examiner's rejection for obviousness-type double patenting is affirmed.

D. The Rejection over Lane

As correctly surmised by the examiner, the "main issue" or dispositive issue in the rejection over Lane as the primary reference is whether Lane discloses or suggests the formation of a silicon dioxide film containing a halogen (fluorine). See the Answer, pages 13 and 20. As correctly argued by appellant, Lane teaches that no fluorine was found in the silicon dioxide deposited in the process of Lane (Brief, page 8). See Lane, col. 5, 11. 29-43. The examiner argues that the sensitivity of the RBS test in Lane is not known, and thus there could be some fluorine in the

film of Lane which would read on the film recited in the claims since the amount of halogen is not specified in the claims on appeal (Answer, page 13). However, the examiner incorrectly places the burden of proof on appellant to "differentiate" over the amount of fluorine that might be present in Lane, when the correct burden of proof rests with the examiner. See *In re Oetiker, supra*. Since the examiner has not met this burden of proof, by establishing the amount of fluorine sensitivity in the RBS tests of Lane, on this record we cannot sustain the examiner's rejection over Lane. We note that the secondary references to Ishihara, Yamazaki, Kuyel, and Chebi do not remedy the deficiency in Lane discussed above.

E. The Rejection over Homma

The examiner finds that Homma teaches production of a silicon dioxide film with fluorine from a plasma deposition of TEOS and a halogen containing compound (Answer, page 17). The examiner also finds that Homma teaches a deposition technique including plasma produced in a parallel plate reactor with a RF power source but does not disclose use of dual frequency plasmas (*id.*). Therefore the examiner applies Chebi or Nguyen for their "demonstrating the known use of duel [sic, dual] frequencies with similar reactants for analogous purposes." Answer, sentence bridging pages 17-18.

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From these findings, the examiner concludes that it would have been obvious to use other plasma techniques known for silicon dioxide deposition in the process of Homma (Answer, page 17).

Even assuming *arguendo* that it would have been obvious to use the plasma creation techniques taught by Chebi and Nguyen in the process of Homma, we determine that the limitations of the claims on appeal would not have been met. The processes recited in claims 29 and 39 on appeal do not merely require a plurality of power sources, each having a different frequency, but also requires that the power sources are operated simultaneously. The examiner has not addressed this limitation of the claimed subject matter nor pointed to any disclosure or teachings of the secondary references regarding this limitation. See Nguyen, col. 3, ll. 7-18 and 36-48, and Chebi, col. 3, ll. 22-34, both of which appear to suggest that deposition occurs sequentially, each at a specified frequency.

For the foregoing reasons, we determine that the examiner has failed to establish a *prima facie* case of obviousness in view of the reference evidence. Accordingly, we reverse the examiner's rejection over Homma in view of Chebi or Nguyen.

F. Other Issues

As discussed above, we have determined that the examiner has not shown or established that dual frequency plasma generation occurs simultaneously. However, appellant admits that such a plasma generation was known in the art for certain precursor gases (specification, pages 4 and 14; see also Figures 2A-2F). In the event of further prosecution before the examiner, the examiner and appellant should consider the patentability of the claimed subject matter in view of the cited prior art and appellants' admission of prior art.

G. Summary

The rejection of claims 29-38 and 44 under 35 U.S.C. § 112, second paragraph, is reversed. The rejection of claims 29-38 and 44 under 35 U.S.C. § 112, first paragraph, for lack of enabling disclosure, is reversed. The rejection of claims 29-38 and 44 under 35 U.S.C. § 112, first paragraph, for lack of written description, is reversed.

The rejection of claims 29-30, 32-34, 38 and 44 under 35 U.S.C. § 102 (e) over Nishiyama is affirmed. The rejection of claims 39-40, 42-43 and 45 under 35 U.S.C. § 103 (a) over Nishiyama is affirmed. The rejection of claim 31 under 35 U.S.C.

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§ 103 (a) over Nishiyama in view of Chebi is affirmed. The rejection of claims 29-40 and 42-45 under 35 U.S.C. § 103 (a) over Lane in view of Ishihara, Yamazaki, Kuyel, or Chebi is reversed. The rejection of claims 29-32, 38-40 and 42-45 under 35 U.S.C. § 103 (a) over Homma in view of Chebi or Nguyen is reversed. The rejection of claims 29-33, 38-40 and 42-45 under the judicially created doctrine of obviousness-type double patenting over claims 1-10 of Musaka is affirmed.

Accordingly, the decision of the examiner is affirmed-in-part.

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No time period for taking any subsequent action in connection
with this appeal may be extended under 37 CFR § 1.136 (a).

AFFIRMED-IN-PART

CHARLES F. WARREN)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
THOMAS A. WALTZ)	APPEALS
Administrative Patent Judge)	AND
)	INTERFERENCES
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APPENDIX

29. A plasma enhanced chemical vapor deposition process for depositing a silicon oxide film containing a halogen from a mixture of plasma precursor gases including tetraethoxysilane and a halogen-containing gas onto a substrate mounted in a vacuum deposition chamber which comprises forming a plasma in said chamber from said precursor gases by means of a plurality of power sources connected to said chamber operated simultaneously, each power source having a different frequency.